## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**Patent Application**

Applicant(s):  A. Satoh et al.
Docket No.:   JP920020242US1
Serial No.:    10/762,174
Filing Date:   January 21, 2004
Group:        2193
Examiner:     Tan V. Mai

Title:        Multiplier and Cipher Circuit

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<u>REPLY BRIEF</u>

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants (hereinafter "Appellants") submit this Reply Brief under 37 C.F.R. §1.193(b)(1) in response to the Examiner's Answer mailed on April 29, 2008, relating to the Appeal Brief filed by Appellants on January 31, 2008, appealing the final rejection dated September 26, 2007 of claims 1-13 of the above-identified application.

Appellants initially note that on June 26, 2008, an Amendment After Filing of Appeal Under 37 C.F.R. §41.33(b) was submitted amending dependent claim 4 into independent form. Appellants amended claim 4 in response to the Examiner's statement on page 2, section 3 of the Examiner's Answer:

> After review Appellants' argument, Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Further, on June 30, 2008, Attorney James M Lee (Reg. No. 61,588) contacted Examiner Mai via telephone regarding the above-noted amendment. The Examiner stated that the amendment has been entered. For at least these reasons, Appellants respectfully submit that claim 4 is no longer on appeal because claim 4 recites allowable subject matter and is no longer dependent upon a rejected base claim.

Apart from the above-noted amendment, Appellants respectfully respond to the Examiner's Answer. First, with regard to the §102 rejection of claims 1 and 3 in view of Kelley, Appellants note that the Examiner relies heavily on figure 3 of Kelley to support his arguments. Appellants assert that figure 3 of Kelley fails to teach a Wallace tree block and a carry propagation adder as recited in claim 1.

The Examiner argues that Kelley discloses a "Wallace multiplier tree" at Kelley, col. 1, line 63, to col. 2, line 44. Examiner's Answer, page 10, second paragraph. The Examiner further argues that the multiply reduction tree (Kelley, FIG. 3, 524), sum register (Kelley, FIG. 3, 530), carry register (Kelley, FIG. 3, 535), and adder (Kelley, FIG. 3, 560 [sic]) are considered the claimed "Wallace tree block" and "carry propagating adder," respectively. Examiner's Answer, page 10, second paragraph. Appellants disagree and respectfully submit that the Examiner is mischaracterizing figure 3 of Kelley.

Appellants submit that the Examiner is improperly combining various portions of Kelley to engineer a rejection. For example, Kelley discloses the term "Wallace multiplier trees" when describing the multiply reduction tree 525 of figure 1, not figure 3. Therefore, even if the multiply reduction tree 525 of figure 1 is a Wallace tree block, it is incorrect to assume that figure 3 (e.g., element 524 or a combination of elements 524, 530, and 535) also illustrates a

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Wallace tree block. In fact, when describing figure 3, Kelley discloses that the sub-iterative multiply reduction tree 524 of figure 3 is different than the multiply reduction tree 525 of figure 1. Kelley, col. 3, line 41, to col. 4, line 10. Appellants further note that unlike figure 1 of Kelley, figure 3 illustrates a different arrangement comprising a sub-iterative multiply reduction tree 524, a sub-sum register 530, and a sub-carry register 535. Therefore, the Examiner's contention that figure 3 shows a Wallace tree block is an assumption not supported by the written description of figure 3. Rather, the Examiner incorrectly relies on the description of figure 1 to show that figure 3 shows a Wallace tree block. For at least these reasons, Appellants believe that figure 3 of Kelley fails to teach a Wallace tree block as recited in claim 1. It follows that claim 3 is patentable over Kelley due to its dependency from independent claim 1.

Next, the Examiner argues on page 10, first paragraph, of the Examiner's Answer that Kelley teaches a carry propagation adder as recited in claim 1. The Examiner states that the terms "carry save form" and "redundant binary form" are interchangeable. The Examiner then argues that adder 740 of Kelley, figure 3, carries out the same function as a carry propagation adder converting a redundant binary number as recited in the claims. Appellants disagree. Nowhere does Kelley disclose that adder 740 converts a redundant binary number outputted from the Wallace tree block into a resulting product in two's complement form.

Nonetheless, the Examiner argues on page 11, first full paragraph of the Examiner's Answer that Kelley (e.g., Kelley, FIG. 3, adder 740) teaches a final result in two's complement form. Appellants initially submit that Kelley simply mentions the term "two's complement" in passing. Kelley does not teach a carry propagation adder converting a redundant binary number outputted from the Wallace tree block into a resulting product in two's complement form. Furthermore, even if Kelley were describing a carry propagation adder converting a redundant binary number into a resulting product in two's complement form, the Examiner's argument is still without merit because, once again, the Examiner is improperly combining various portions of Kelley. The Examiner cites text from Kelley, col. 6, lines 17-22, which is a description of figure 4, not figure 3. Therefore, the Examiner incorrectly assumes that the description of figure 4 is applicable to figure 3. Appellants note that figure 3 is an illustration of prior art, while figure 4 is an illustration of Kelley's proposed invention; therefore, the two descriptions are not interchangeable.

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Appellants reiterate that the Examiner cannot sustain a §102 rejection because the Examiner bases his rejection of the claimed limitations on the structure of <u>figure 3</u> of Kelley, yet, the Examiner relies on the language and terminology used by Kelley to describe other figures. Appellants concede that this may be valid if all the figures described different aspects of the same invention; however, in this instance, Kelley describes his invention (e.g., FIGs. 4-9) with reference to prior art (e.g., FIGs. 1-3), and it is improper to assume that the language describing Kelley's invention and the language describing the various prior art can be easily and clearly intertwined. For at least these reasons, Kelley fails to anticipate claims 1 and 3

With regard to the obviousness rejection of claims 2 and 5-13, Appellants assert that Hansen does not remedy the deficiencies of Kelley with regard to "a result of the calculation of the sum calculation block is outputted as a result of the <u>multiplication over an extension field of two</u>." Nowhere in paragraph 47 of Hansen does Hansen disclose an extension field of two as recited in the claims. In one illustrative embodiment, an extension field of two is described in the specification at, for example, page 10, lines 16-20, with reference to FIG. 7; see also Specification, page 4, lines 22-25 ("performing multiplication over an extension field (finite field $GF(2^n)$) of 2 . . .").

In addition, the Examiner presents insufficient evidence for a motivation or suggestion to combine or modify the cited references. The Examiner argues at page 12, last full paragraph of the Examiner's Answer:

> Kelley et al's sum output portion is available. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to design the claimed invention according to Kelley et al's teachings because the circuit is a multiplication/accumulation capable of providing the sum portion of product in Galois field application as claimed.

Appellants respectfully submit that this is a conclusory statement of the sort rejected by both the Federal Circuit and the U.S. Supreme Court. <u>See</u> <u>KSR v. Teleflex</u>, No. 13-1450, slip. op. at 14 (U.S., Apr. 30, 2007), <u>quoting</u> <u>In re Kahn</u>, 441 F. 3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). There has been no showing in the present §103 rejection of objective evidence

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of record that would motivate one skilled in the art to combine Kelley with Hansen to produce the particular limitations in question. The Examiner has not clearly shown how the teaching of Hansen's polynomial multiplication can be combined with Kelley.

For at least these reasons, the cited references fail to render claims 2 and 5-13 unpatentable.

With regard to the rejection of claims 6-8, the Examiner argues on page 12, last full paragraph of the Examiner's Answer that:

> It is submitted that Kelley et al do not show the detail of dependent claims 6-8; however, the claimed (1) "exclusive OR operation" feature and (2) "half adders" and "full adders" features are well known in the (1) adder art and (2) Wallace tree art, respectively.

Appellants assert that if the Examiner's assertions are true, the Examiner should provide evidence of record supporting these assertions. So far, the Examiner has not provided any such evidence. For at least these reasons, Appellants believe that claims 6-8 recite patentable subject matter.

For at least the reasons stated above and those previously provided in Appellants' Appeal Brief, Appellants respectfully request withdrawal of the rejections of claims 1-3 and 5-13. Appellants further assert that claim 4 should not be considered on appeal because the claim is in allowable form. As such, the application is asserted to be in condition for allowance, and favorable action is respectfully solicited.

Respectfully submitted,
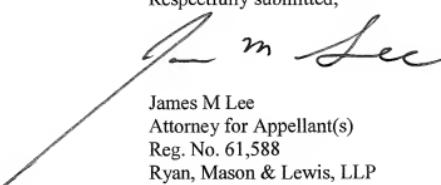
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